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Analyzing the Thoughts of Ecological Footprints of University Students: A Preliminary Research on Turkish Students

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Abstract

Investigating the carbon, food, goods and services usage and consumption levels of people to realize probable damage of consumption habits is essential to decrease ecological destruction and at the same increase consciousness of people in our planet. This paper's aim is to present the results of questionnaire of ecologic footprint that was applied to 420 Turkish students, in the southern part of the country. As a data collection tool "Ecological Footprint Quiz", placed on www.myfootprint.org site, was used. The questionnaire had four main parts. First three parts include statements about the carbon, food, goods and services footprint. Housing footprint statements has ignored in this study, because university students generally live in dormitories or rented houses, not in their own houses. The last part of the questionnaire, participants responded to demographic questions. Descriptive statistics was conducted to analyze the data.

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1. Introduction

Since 1980s, ecologic problems are occurred in our planet due to rapidly increasing population, industrialization, urbanization, and technological developments (Borucke, Moore, Gemma, Gracey, Iha & Joy, 2011). In near future it is seen that earth is not able to meet human's needs in a sufficient way as today's. Growing population fast leads to waste resources more and bring pollution to our environment. Depending on our living arrangements, it can be easier and challenging to account for our consumption of commodities like water, natural gas and electricity. Measuring

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consumption patterns of your water, electricity and gas are the first valuable tips to reduce wasting resources. Sustainability is directly related to using effectiveness of natural resources and its factors. Last decade conscious people began to recognize of world's limited resources and their importance for our tomorrows. Economic prosperity and societal well-being depend on the planets capacity to provide resources & ecosystem services and while most policy decisions are taken on an assumption of limitless resources and ecosystem services, the planet has boundaries and sustainable development cannot be secured without operating within them (Akıllı, Kemahlı, Okudan & Polat, 2008). The ecological footprint gives an estimation of the biologically productive land that is necessary to sustain current natural values (Borucke, Moore, Gemma, Gracey, Iha & Joy, 2011). Demand for natural resources in Turkey is increasing along with the rise in population and wealth. This study is prepared to analyze the ecological footprint quiz choices of university students living in Adana, Turkey. There are some studies measuring Turkish people's ecological footprints, but any research analyzing choices of university students in relation to ecological footprint quiz is not found. By conducting this research, detailed information will be obtained about carbon, food, goods and services usage and consumption amount of students. In order to increase the consciousness of Turkish people about ecological balance it is needed to spread these kinds of papers. Students were selected as a sample of Y generation due to understand the manners of them. Y generation members are called the next generation of spenders. Therefore it is important to investigate carbon, food, goods and services usage and consumption of students to realize probable damage of consumption habits.

2. Conceptual Framework

2.1. Sustainability and Ecological Footprint

Sustainable development is accepted as one of the key factor for global economy in the future. One of the key aspects of sustainable development is that it makes us consider the problems of intergenerational and intragenerational equity. As currently reported the ecological footprint merely shows that current human development is unsustainable- we only have one earth (Moffatt, 2000; Ward & Dubos, 1972). The main goal of sustainable development economy is to improve well-being and to lower the exploitation of global resources at the same time (Latszek, 2013). Sustainable consumption is the consumption behavior of private households aimed at contributing to the sustainable development of society. The agenda 21 which was adopted at the Rio conference in 1992 introduced the term "sustainable consumption" into scientific and environmental political discussion. Non-governmental organizations (NGOs) specifically focused on environment and sustainable consumption, and to some degree, other more general Civil Society Organizations (CSOs) like consumer organizations, have traditionally played an important role in developing and implementing initiatives to promote more sustainable

The concept of ecological footprint was created by Mathis Wackernagel and his professor William Rees within their PhD thesis (www.wikipedia.org, 22.07.2014). Then they developed the tools to measure and worked on the relationship of sustainability concept over the countries by this way. According to the report of World commission on environment and development By United Nations in 1987 discussions were structured about the destructive social and ecological impacts of humanity's current approach to development that became prominent on political agendas. The starting statement was directly related to challenges for human's future. The commission declared these sentences: "we all depend on one biosphere for sustaining our lives. Yet each community, each country, strives for survival and prosperity with little regard for its impact on others. Some consume the earth's resources at a rate that would leave little for future generations. Others many more in number, consume far too little and live with the prospects of hunger, squalor, disease, and early death" (Wackernagel, 1994). An ecological footprint is the area, for examples hectares, of productive land and water required for a given population to maintain their consumption and absorb the ensuing waste over the course of one year (Venetoulis, 2001). The concept of ecological footprint (EF) is well known amongst ecological economists and it represents the human impact on the Earth in a clear manner and the ecological footprint compares renewable natural resource consumption with nature's biologically productive capacity (Moffatt, 2000). Similarly EF measures the extent to which humanity is using nature's resources faster than they can regenerate and it is usually presented together with biocapacity (BC) that measures the bioproductive

supply. The difference between these items is called as deficit or reserve (or overshoot for the globe). The biocapacity can be described as a method that answers the question of “how many of the renewable resources have been made available by the biosphere’s regenerative capacity?” and represents the bulk of the biosphere’s regenerative capacity (Schaefer, Luksch, Steinbach, Cabeça & Hannaur, 2006).

There are several pros and cons for ecological footprint. The major advantages are; the former concept gives a clear message, the calculation is easy and simple, includes trade and it is a stock. It is obvious that each areal unit can also supply a flow of goods, information, natural and manmade capital as well as pollution into and out of the region (Moffatt, 2000). Our impact on preventing planet from bad events are on our hands by arranging our lifestyle, human can do himself easily. The limitations can be listed as, it is a static analysis, it ignores technological changes, underground resources, and flows. A sustainable lifestyle is defined as one that does not use more natural resources at a faster rate than the Earth makes available. Natural resources can be used by consuming, polluting or discarding garbage by ourselves (Schwegler, Tuncer & Peter, 2008).

2.2. Turkey’s Ecologic Footprint Report

The statistics of global footprint network (2010) shows that ecological footprint of consumption in 2007 was at the level of 8 billion global hectares (gha), and in total, and, 2.7 gha per capita and biocapacity was as 11.9 billion gha and 1.8 gha per capita. This scores means that deficit of biocapacity is 0.9 gha for per person. Biocapacity per capita continuously declines as population increases. The global biocapacity debt, also called overshoot (www.footprintnetwork.org, 22.07.2014).

According to the report of footprintnetwork.org for Turkey’s situation, the following information is gathered. In Turkey, ecological footprint of consumption was 2.7 gha in 2007, which was equal to the world average value but lower than the average of Mediterranean countries. Ecological footprint of consumption in Turkey is 50% higher than the global bio capacity per capita. This value is an indication of a globally unsustainable life style in Turkey. Turkey’s Ecological footprint per capita has not presented a big change in years. In spite of the stability of Footprint per capita since 1961, there is considerable increase in the gross domestic national income per capita (GNI).

Ecological footprint of production exceeded Turkey’s biological capacity for the first time in 1972, and Turkey’s biological capacity reached to the amount of double. As in many other countries of the world, the highest increase in the footprint in Turkey is of carbon origin. The footprint of CO₂ emissions generated by electricity production in Turkey was 26.7 million gha in 2007; this value is equal approximately to 14% of Turkey’s total consumption of Ecological footprint and 26% of the Carbon Footprint [3]. For Turkey there is a big gap between income levels of population. Similar to the global values, families who have higher income have a bigger ecological footprint than the lower ones. The major issue for Turkey’s ecologic debt resulted from the population size of the country. Year by year the population grew so fast. Comparing between 1996 and 2007, Turkey’s population raised from 28 million to 73 million (www.footprintnetwork.org, 22.07.2014). Current year (2014) ,the population size is nearly 80 million.

3. Methodology

3.1. Study Design

As a data collection tool “Ecological Footprint Quiz”, placed on www.myfootprint.org site, was used. The period was between 30.04. 2014 and 30.06. 2014. The questionnaire had four main parts. First three parts include statements about the carbon, food, goods and services footprint. In the report of environmental impact from ecological footprint, total consumption footprint: all products per person (gha) is listed as; housing gha is equal to transport rate (0, 23), food gha is equal to 1,06; goods gha is equal to 0.42; services is equal to 0,06 and the others gha is equal to 2,20, and total carbon foot print is equal to 1.36 gha (www.eurepa.net, 22.07.2014). Housing footprint statements has ignored in this study, because university students generally live in dormitories or rented houses, not in their own houses. The last part of the questionnaire, participants responded to demographic questions. Descriptive statistics was conducted to analyze the research questions.

3.2. Sample

The study sample comprised of 420 university students lived in Adana, southern part of Turkey. Adana is one of the five largest cities in Turkey with a population of nearly more than 2 million. Undergraduate and graduate university students were selected for the sample because they can evaluate and answer the questions in an effective-manner for the purposes of the research. The sample's demographic statistics are presented in Table 1.

Table 1. The sample's demographic statistics.

Gender	Frequency	Percentage
female	232	55,2
male	186	44,3
not answered	2	,5
Age		
18-23	342	81,4
24-29	64	15,3
30-35	8	1,9
Not answered	6	1,4
Personal income		
under union rate	240	57,1
union rate – TL 1000	84	20,0
TL 1001 – 1500	38	9,0
TL 1501 – 2000	15	3,6
TL 2001 – 2500	8	1,9
TL 2501 – 3000	1	,2
TL 3001 – 3500	3	,7
TL 3501 – 4000	1	,2
Above TL 4000	3	,7
Not Answered	27	6,4
Size of household		
1	9	2,1
2	15	3,6
3	91	21,7
4	137	32,6
5	165	39,3
Not answered	3	,7
Total	420	100

Table 2, 3, 4 and 5 present the results of the questions related to carbon footprint estimation. As seen in table 2, respondents mostly live in “150 - 200 square meters” home. Most of the home is located inner city as seen in table 3. In table 4, it is seen that electricity is the most preferred energy source used in home.

Table 2. Size of the home.

Size of the home	Frequency	Percentage
50 - 100 square meters or less	37	8,9
100 - 150 square meters	136	32,3
150 - 200 square meters	158	37,6
200 - 250 square meters	64	15,2
250 square meters or larger	21	5,0
not answered	4	1,0

Table 3. Home location.

Home location	Frequency	Percentage
Inner city	244	58,0
Older suburb	59	14,0
Newer suburb	75	18,0
Rural	38	9,0
not answered	4	1,0

Table 4. Energy sources used in home.

Energy sources	Frequency	Percentage
Electricity	301	71,7
Natural gas, propane, or liquefied petroleum gas	145	34,5
Heating oil	11	2,6
Wood or biomass	132	31,4

Table 5 includes the energy saving habits of respondents. It is seen that turning off lights when leaving rooms, drying clothes outside whenever possible and turning of computers and monitors when not in use are the most commonly performed activities to save energy.

Table 5. Energy saving habits.

Energy saving habits	Frequency	Percentage
Turn off lights when leaving rooms	370	88,1
Use power strips to turn off stand-by lights	138	32,9
Turn off computers and monitors when not in use	277	66,0
Dry clothes outside whenever possible	289	68,8
Keep thermostat relatively low in winter	69	16,4
Unplug small appliances when not in use	269	64,0
Minimal use of power equipment when landscaping	63	15,0

Table 6, 7, 8 and 9 present the results of the questions related to food footprint estimation. As seen in table 6, respondents mostly prefer Omnivore diet type. And 60% of respondents claim that they normally eat two large meals and two or three light or medium sized snacks per day, as shown in table 7.

Table 6. Diet type.

Diet type	Frequency	Percentage
Vegan – Plant based foods only	15	3,6
Vegetarian – Primarily plant based foods, but some dairy	24	5,7
Omnivore – An assortment of meat, seafood, vegetables, dairy, and grains	322	76,7
Carnivore – Meat, seafood, and dairy several times a week	35	8,3
Top of the food chain – Meat, seafood, or dairy at almost every meal	22	5,2
not answered	2	0,5

Table 7. The amount of food.

The amount of food	Frequency	Percentage
One large meal and a couple of light snacks per day	59	14,0
Two large meals and two or three light or medium sized snacks per day	252	60,0
Three large meals and several hefty sized snacks in between	105	25,0
not answered	4	1,0

Analyzing food obtaining place, as seen in table 8 most of the respondents prefer supermarkets for some items, natural food stores for others. And table 9 presents that most of the respondents “sometimes” select foods that are certified organic or sustainably produced.

Table 8. Food obtaining place.

Food obtaining place	Frequency	Percentage
Farmers markets, gardens, cooperatives, and other local and fresh sources	81	19,3
Natural foods markets	35	8,4
Supermarkets for some items, natural food stores for others	186	44,3
Supermarkets, convenience stores, and prepared foods from restaurants	100	23,8
Restaurants, fast foods, and take out	12	2,8
not answered	6	1,4

Table 9. Frequency of selecting certified foods.

Frequency of selecting certified foods	Frequency	Percentage
Most of the time	109	25,9
Sometimes	216	51,5
Almost never	92	21,9
not answered	3	,7

Table 10, 11, 12 and 13 present the results of the questions related to goods and services footprint estimation. Almost 70% of respondents claim that they generally live within their means, as shown in table 10. And as seen in table 11, 53% of respondents use some items for years, others they replace before they need to.

Table 10. Saving and spending habits.

Saving and spending habits	Frequency	Percentage
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I tend to spend all of my income and then some.	63	15,0
I generally live within my means.	292	69,5
I am a frugal spender, and regularly save money for the future.	61	14,5
not answered	4	1,0

Table 11. Frequency of buying new things.

Frequency of buying new things	Frequency	Percentage
I tend to use things until I genuinely need to replace them.	132	31,4
Some items I use for years, others I replace before I need to.	225	53,6
I frequently replace belongings even if they are in good condition.	60	14,3
not answered	3	,7

Looking at the table 12, it is seen that respondents do not tend to recycle materials a lot. At the one hand paper is the most recycled material, and the other hand aluminum is at least recycled material. Lastly, respondents are asked how often they select items labeled as recycled, natural, and organic when they buy clothing or paper products. 48% of respondents “sometimes” select items labeled as shown in table 13.

Table 12. Recycling Materials.

Materials	None (Freq./Perc.)	A fair amount (Freq./Perc.)	Almost all (Freq./Perc.)	Not answered (Freq./Perc.)
Paper	130/30,9	201/47,9	73/17,4	16/3,8
Aluminium	299/71,2	69/16,4	23/5,5	29/6,9
Glass	238/56,7	116/27,6	40/9,5	26/6,2
Plastic	175/41,7	158/37,6	66/15,7	21/5,0
Electronics	266/63,3	86/20,5	42/10,0	26/6,2

Table 13. Selecting labeled items.

Selecting labelled items	Frequency	Percentage
Almost never	166	39,5
Sometimes	203	48,3
Almost always	46	11,0
Not answered	5	1,2

4. Conclusion

Nature can restore renewable resources only at a certain rate; however, humankind can consistently increase consuming renewable resources at a faster rate than ecosystems can restore them (Schaefer, Luksch, Steinbach, Cabeça & Hannaur, 2006). The certain factor is related to question of how fast we use a specific source instead of what we use and how much we use the resource. This paper takes a small step toward addressing the university students’ lifestyles based on ecologic footprint topic. The research question is established as “what is profile of university students about consuming resources, in Turkey, being a preliminary research this paper represented the frequencies of the sample students’ manners, in the future study’s authors planning to calculate more students from all cities in Turkey to generate results to whole. Realizing the plan of 2050 for Turkey’s ecologic footprint, we need

to make this issue promote more. Creating and increasing public awareness is also major topic for benefiting from these efforts.

To be able to lead sustainable lifestyles based on informed purchasing decisions and changes in behavior, consumers need the support of all actors including; business, government and civil society. Based on this criteria, business has to set up further dialogues with their stakeholders (consumers, retailers, marketers, NGOs, etc.) In order to define sustainable products and lifestyles, businesses formulate actionable responses (www.wbscd.org, 22.07.2014). In this way all stakeholders must work together to save planet and their future within win-win strategy. This study shows that the major environmental footprints used for a sample of Turkish students. Consumption categories are classified as seen in the quiz are food, goods, services and carbon footprints. According to the results students mostly prefer living in “150 - 200 square meters” home. Most of the home is located inner city and electricity is the most preferred energy source used in home. It is seen that turning off lights when leaving rooms, drying clothes outside whenever possible and turning of computers and monitors when not in use are the most commonly performed activities to save energy. Respondents mostly prefer Omnivore diet type. And 60% of respondents claim that they normally eat two large meals and two or three light or medium sized snacks per day. Analyzing food obtaining place, most of the respondents prefer supermarkets for some items, natural food stores for others, also most of the respondents “sometimes” select foods that are certified organic or sustainably produced.

Results of the questions related to goods and services footprint estimation. Almost 70% of respondents claim that they generally live within their means 53% of respondents use some items for years, others they replace before they need to. It is seen that respondents do not tend to recycle materials a lot. At the one hand paper is the most recycled material, and the other hand aluminum is at least recycled material. Lastly, respondents are asked how often they select items labeled as recycled, natural, and organic when they buy clothing or paper products. 48% of respondents “sometimes” select items labeled. To prevent ecological overshoot besides other countries, Turkey has to implement some plans including; ecological footprint should be integrated into Turkey’s major development plans and its economic growth Turkey should integrate its targets on environmental sustainability into the plans, should increase its resource efficiency, and should create values for ecosystem services included in pricing of goods and services, new protected areas should be created, lands should be managed effectively, public institutions, private sector, NGO’s, universities and all other stakeholders must work collaboratively in order to tackle environmental issues, over consumption must be stopped and green investments should be promoted, a regulatory framework must be created for sustainability finance criteria and incentives must be increased toward this goal (www.footprinetwork.org, 22.07.2014).

The existence of networks and the collaborative and cooperative work among different groups has been found to be effective for the marketing and advertising of different issues (Kavoura, & Katsoni, 2013). for this study we just compared Turkish students footprint, in the following studies we would like to compare cross cultural footprints. In the further research the authors are planning to calculate each student’s ecologic footprint and compare through years and with cross cultural studies.

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